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Spot Observation: An Introduction and Examination

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Spot observations have been used in a number of studies to measure aspects of culture as independent variables predicting performance on cognitive tests. I used spot observations in the Guatemalan highlands to determine the children's everyday activities, expecting that they would predict the children's memory-test performance.

The effort to "unpack" (Whiting, 1975) culture as a predictor variable in cognitive research derives from earlier work that related culture and personality (Whiting and Whiting, 1975). These authors present a model in which the ecology of a people determines their maintenance system, which leads to various child-rearing practices that, in turn, produce different personalities in children. The studies concentrating on cognition (e.g., Kagan, et al., in preparation; Munroe and Munroe, 1971b; Nerlove, et al., 1971, 1974; Rogoff, 1977) simply substitute cognitive differences for personality differences in this or similar models. The cognitive enterprise assumes that there is such a thing as cognitive ability, a property of individuals that varies in amount as a function of experience (stimulation, etc.) and maturation.

One finding of the Six-Culture study (Whiting and Whiting, 1975) was that personality characteristics of the children did not seem particularly stable within individuals. Rather, the behavior seemed to be a function of the "target" of interaction. Children did not strongly show "nurturance" in general or "aggressiveness" across all situations; rather, children were nurturant in the presence of infants but not in the presence of adults; aggressive in the company of same-age peers; etc.

This lesson—that personality is not so much a personal as a situational characteristic—may also be applied to the study of cognition. It may be that people don't have *more* or *less* cognitive ability, but that they apply their problem-solving skills to different tasks. Differences in amount of cognitive powers would appear when a person is transferred from familiar to unfamiliar tasks. When I began my spot

observation study attempting to unpack cultural influences on memory ability, I was not aware that I had assumed that people have different amounts of general cognitive power. However, the plan of the study makes sense only if such an assumption is made. In retrospect, I am not certain that the assumption is justified.

Before discussing the outcome of the study that investigated children's activities and memory-test performance, I should describe the method of spot observation and compare it to the collection of data by interview and by more extended observation. Then I will describe the culture and cognition study using spots, and some other uses for spot observations in investigating the social ecology.

THE METHOD

Spot observation is a modified time-sampling method of observation in which the observer is relatively unobtrusive, taking a "mental snapshot" of the activity that is going on before his or her presence is discovered (Draper, 1975; Johnson, 1973; Munroe and Munroe, 1975). In this glance, the observer ascertains ongoing activity and the location of the target person, plus the degree to which nearby persons are involved. In many studies, the observer amplifies the observation glance by asking questions of the people present (e.g., inquiring about the location of the infant's mother if she is not present, or asking whether an older child had been directed to do the observed activity).

To make comparisons between two or more populations, the observations must be carried out very systematically. The interest may be in understanding variations between the activities of people of different ages or sexes (Draper, 1975; Johnson, 1973; Kagan, et al., in preparation; Munroe and Munroe, 1971b; Nerlove, et al., 1971; Rogoff, 1978; Whiting and Edwards, in preparation); from different cultures (Kagan, et al. *ibid.*; Nerlove, et al., *ibid.*; Whiting and Edwards, in preparation); from the same culture but varying in family characteristics, such as household density or modernization (Munroe and Munroe, 1971a; Rogoff, 1977; Whiting and Edwards, *ibid.*); or in performance on psychological tests (Munroe and Munroe, 1971b, 1975; Nerlove, et al., 1971, 1974; Rogoff, *ibid.*). Comparative spot obser-

vations must be done over an extended period, with each person observed equally during different times of the day and days of the week. In order to escape the effects of daily and weekly cycles, enough observations must be made to insure that differences reflect variations between the populations and not merely random fluctuation due to the variability usual in people's activities.

In comparing the behavior of different groups across settings, the investigator must be careful to take differential participation in various settings into account. For example, if one group attends school more commonly than another, observations of distance from home or frequency of adult presence must be considered separately for school occasions. To be able to control for the effect of the settings, the investigator has a choice between eliminating observation in settings which constrain the behavior of one group, or increasing the number of observations. Past studies have involved 10 to 47 observations per individual, spread over a three- to 12-week period. Although spot observations can be carried out accurately and efficiently by native observers (with even minimal education) using well-designed checklists, it is clear that these "instantaneous" observations involve some investment of time.

Advantages of spot observations. What advantages are provided by investing the time for spot observations, rather than by interviewing? Although many types of information can be obtained accurately simply by asking questions, other types are inaccessible to questions because the population does not notice or measure the variables of interest (e.g., amount of time that the child spends alone) or because there may be some motivation to distort the answer (e.g., frequency of school attendance; whether the child plays with children of the other sex).

Studies in the United States have produced considerable evidence that mothers' reports of their own or their children's behavior are inaccurate. Careful observations of child-rearing practices often give results uncorrelated with maternal report data (see Freeberg and Payne, 1967, pp. 75-76, for a review).

In my study of rural Mayan nine-year-olds, I obtained data which allowed a comparison of spot observations with maternal and child reports of children's participation in chores. Thirty spot observations were carried out over a three-month period on 60 nine-year-olds, with agreement of 98 percent between the two trained native observers. The mothers and children were interviewed regarding the children's participation in chores common to children of that age (for girls, washing clothes and dishes, caring for children, weaving, making tortillas; for boys, caring for children, gathering firewood, hoeing corn, and cultivating onions). Percent agreement between observations and reports showed substantial differences. Boy's reports of their own chores were in only

65 percent agreement with the chores they were observed to perform, and mothers of boys were in 66 percent agreement. Girl's reports were in 56 percent agreement with the observations of their chore participation, and their mothers were in 59 percent agreement.

Several biases could have influenced the reports. The mothers often stated that their children never work, "they just play all the time," occasionally adding a reprimand to the child for being disobedient. [Actually, boys were observed to be working on 39 percent of the (nonschool) occasions sampled, and girls on 57 percent of the occasions.] The children were eager to claim that they could perform adult activities, and exaggerated the number of chores in which they participated. Children's chores should have been the easiest of behavioral data to report accurately, because in most cases the mothers had assigned the chores, and the children, of course, performed them. That the percent agreements were so low attests to the usefulness of actually observing the behavior, rather than simply asking about it.

D'Andrade (1975) asserts that an individual's memory of an event is more closely related to the cultural expectations of "what goes with what" than with the actual event. He compared observations of small group interactions, ratings made immediately afterward by the participants of each other's behavior, and ratings made by the observer after the session, with independent judgments of similarity of meaning for each pair of social-behavior categories used in the observation and rating scale. The participants' ratings and the observer's ratings were similar to each other, and to cultural expectations as measured by the judgments of similarity of the social-behavior categories. Neither the participants' nor the observer's ratings, nor the semantic-similarity judgments were similar to the record of the event as observed. D'Andrade emphasizes the importance of not relying on reports from memory in the investigation of actual behavior.

How do spot observations compare with more extended observations? Spots have the advantages of being rapid, sampling many occasions, and diminishing the intrusive effect of the observer. They give accurate information as to the child's location, ongoing activity, and the people present. Investigators have used spot observations to obtain the following information: proportion of time that an infant is held and by whom (Kagan, et al., *ibid.*; Munroe and Munroe, 1971a, 1975); complexity of the child's routine activities (Munroe and Munroe, 1975); involvement in self-managed sequences of activity and voluntary social activities (Nerlove, et al., 1974); distance from home (Draper, 1975; Kagan, et al., *ibid.*; Munroe and Munroe, 1971b; Nerlove, et al., 1971; Rogoff, 1977; Whiting and Edwards, in preparation); and companionship and participation in chores

and play (Draper, 1975; Johnson, 1973; Kagan, et al., *ibid.*; Rogoff, 1977, 1978; Whiting and Edwards, *ibid.*).

Disadvantages of spot observations. Spot observations cannot provide some important information available in more extended observations. A useful analogy (thanks to M. Zaslow) is the difference in the information available from snapshots and that from movies. Neither spots nor snapshots provide information regarding the events leading up to the activity or why it is being performed, nor do they give much information as to the nature of interpersonal interactions. Extended observations of time or event sequences, like movies, give a detailed picture of the development of the situation observed. An interest in whether the child is leader or follower, or whether supervised or simply in the presence of an adult is best satisfied by an extended observation, rather than a spot-observation glance. [Note, however, that some investigators (e.g., Nerlove, et al., 1975) supplement spot observations with brief questions to arrive at some of this information.]

SPOT OBSERVATIONS OF CHILDREN'S ACTIVITIES AS PREDICTORS OF TEST PERFORMANCE

Spot observations were chosen as an economical and unobtrusive means of obtaining accurate information regarding the everyday activities of children. They had previously been used by several other researchers (e.g., Munroe and Munroe, 1975; Nerlove, et al., 1974) to obtain "unpackaged" independent variables for prediction of cognitive test performance. The present study (Rogoff, 1977) grew out of that background. It was expected that children who performed more complex chores, played rule games (as opposed to imitative or idle play), were farther from home, and were in the company of adults, rather than children, would show better performances on a battery of memory tests.

The 33 variables derived from the spot observations reflected the proportion of the total number of complete observations in which the child was observed to be in a particular activity or setting. They are as follows:

No one knows child's whereabouts; within a block of home; further than a block but within town limits; outside the town limits; with adult companion; older child companion; older female companion; older male companion; same-age child companion; female child companion; male child companion; younger child companion (other than a charge); charge as companion; no companion at all; any companion (other than a charge); playing rule game; playing casually; beach play; any simple play activities; idle; being taught; doing any kind of work (combining other categories); errand; washing and housework; child care; shucking corn or beans or cleaning onions; selling in store or

peddling; gathering firewood or fodder; agricultural work with corn or onions; weaving or sewing; making tortillas or other food; doing odd chores which do not fit other categories; doing any complex chore (combining other categories).

The memory tests given to the same 60 nine-year-old children were of visual recognition and recall (using scenes of toy models of familiar objects) and verbal recognition and recall (of Mayan prose). The tests were extensively piloted with the sample to be interesting, as well as to deal with familiar materials and processes, and administered by the author and a local woman in the Mayan dialect.

Simple correlations were calculated for each sex between each of the 33 activity variables and the four memory-test scores. Of the resulting 264 correlations, three would be expected to be significant at the .01 level by chance alone, and another 10 would be significant at the .05 level. In fact, there were only four significant correlations at the .01 level, and only 20 more at the .05 level. These few significant correlations were scattered randomly, rather than forming any pattern.

Nevertheless, nine of them were chosen on the basis of statistical promise or theoretical interest for analysis by multiple regression: whereabouts unknown; female child companion; male child companion; any companion (other than a charge); playing rule games; involved in simple play; doing any work activity; the child being taken care of as companion; and doing complex chores. This selection procedure is, of course, likely to *overestimate* the contribution of child's activity variables to prediction, since some would be chosen on the basis of statistics which meet the criterion due to chance variation. Two child-status variables, sex and age (there was a 17-month span in ages between the children), were included as controls. *None* of the regression equations including any combination of the nine selected child's activity variables (plus age and sex) approached significance, despite the bias in selection procedure.

Two of the nine variables did enter significantly into a few regression equations when a number of demographic variables were controlled statistically. Children often involved in child care performed better on the test of verbal recognition, once the effect of skill at school tasks (reading, writing, arithmetic, Spanish vocabulary) was controlled. Children who were commonly involved in simple play activities (casual play, goofing off, not rule games) performed more poorly on the verbal-recall test, once the effects of skill at school tasks and modernity of maternal occupation were controlled. These were the only two activity variables to show any significant prediction of memory scores, and each predicted only one of the four tests (rather than showing a consistent pattern), so it seems most reasonable to conclude that the

activity variables were not particularly predictive of the memory scores.

It may seem surprising that no relationship was found between routine activities and memory-test performance, inasmuch as the observations and tests were performed with such care. The simplest interpretation of this finding is that something other than memory "ability" takes priority in the assignment of everyday chores and activities. Some rather obvious family and ecological characteristics lend plausibility to this alternative. Participation in child care is determined largely by the presence of an infant in the family, and of other children to help care for the infant. Participation in agriculture is influenced by the distance of fields. A family with no fields needs no help working them, and a family with distant fields will wait until the child is older to take him on the long hike to the fields. Tortilla-making is less likely for the girl if she has older sisters to take care of the task. These examples illustrate selective factors which could overshadow cognitive ability in determining the activities of the children.

An explanation that still does not disrupt the framework of the endeavor is that if some other aspect of daily activities were measured (less concretely related to family structure and possessions), it might predict memory performance. Nerlove, et al. (1974) used spot observations to determine the extent of participation in self-managed sequences ("following an exacting series of sequences") and voluntary social activities, and related these inferential variables to the children's performance on tests of analytic ability and language facility. The five- to eight-year-old Guatemalan non-Indian children were observed 20 times each. The results showed that self-managed sequences were related positively to analytic ability, and voluntary social activities were related positively to language facility.

The discrepancy between the results of Nerlove and colleagues and those of the author may arise simply because memory is a cognitive skill more independent of the environment than are analytic ability and language facility. It may also be that the more inferential nature of the data of Nerlove, et al. (scoring "self-managed sequences" rather than the exact activity, for example) freed the observations from the constraints provided by family structure, which was discussed in a previous paragraph. However, when the memory scores of the present study were compared with the frequency of self-managed sequences (by scoring activities which Nerlove, et al. use to illustrate self-managed sequences), no improvement over the more concrete measures of children's activities was found. The difference may lie in Nerlove's classification of activities as self-managed sequences. Reliability measures were not performed on these codings (Nerlove, et al., 1974).

The third line of argument for explanation of the lack of relationship between routine activities and memory-test performance is that memory tests do not reflect the abilities necessary for the performance of everyday activities. Rather than searching for better observational measures of everyday activities, it is reasonable to conclude that tests may not be general measures of cognitive abilities, but only measures of cognitive performance in one specific situation. The children's everyday activities may well be related to their memory abilities, but not to their skill in memory tests.

Several authors have argued similarly that test skills may not generalize to everyday skills. Bronfenbrenner (1977, p. 513) suggests that "much of contemporary developmental psychology is the science of the strange behavior of children in strange situations with strange adults for the briefest possible periods of time." Cole, Sharp, and Lave (Cole, et al., 1976) point out that versions of most cognitive tests can be found in Binet's early attempts to predict success in French schools, and that we have no evidence that these skills are measures of ability that can be generalized beyond the test and school contexts. These arguments support the interpretation that memory-test scores and the observed everyday activities may be unrelated because test scores are not general measures of the skills required for (or practiced in) everyday activities.

The fourth explanation relates back to the assumption described at the beginning of this paper. Perhaps prediction of memory ability from environmental variables was unsuccessful because no such *thing* as general memory ability exists in varying quantities in different individuals. I should mention that, although a child's activities were not predictive of memory-test scores, I did find that maternal teaching style (use of verbal instruction versus demonstration) was highly predictive of the verbal (not the visual) memory-test scores. It may be that maternal teaching style relates to test-taking rather than to memory skills.

My study, as well as those of others, does not provide a resolution among the various explanations. However, I hope my discussion does point out several problems: children's activities are determined by many constraints in the family structure; there is insufficient theoretical guidance for determining what aspect of everyday activities might relate to test performance; there is no evidence that test performance is related to cognitive processes used in everyday activities; and there is an unsupported assumption that individuals "possess" variable amounts of cognitive power.

OTHER USES OF SPOT OBSERVATIONS

Despite the difficulties I have outlined, spot observations are useful in other contexts, such as in exami-

nation of the differences in the activities of children of different sexes, family backgrounds, and amounts of schooling.

A number of interesting sex differences appeared in the nine-year-old children's activities. (The comparisons which follow are all significant at $p = .05$ or better.) Boys' whereabouts were more often unknown, and they were more often outside the town limits. Boys were more often in the company of adults and older children; girls were more often with charges or alone. Both boys and girls were found more with their own sex. Girls worked much more than boys; they did more errands, washing, child care, weaving, and food preparation. Boys did more gathering of firewood and fodder, and farming. A careful cross-cultural analysis of sex differences in children's activities, settings, and companions is currently under way (Whiting and Edwards, in preparation). It examines spot observations from eight cultures and social-interaction observations from 16 cultures.

The present study also found interesting relations among the activity variables, and between them and some family demographic variables. Those children who were often with companions were commonly playing rather than working, especially if the companions were boys, rather than girls. Those who played more often worked less frequently. Those who were often involved in child care were also frequently alone, and played less. There was a hint that modern families' children played more and worked less, and children of merchant mothers were involved in more complex chores. Children advanced in school (the range was kindergarten to third grade, although all were nine years old) appeared to perform complex chores more often.

The companionship of the nine-year-old children changed greatly depending on their location and activity (Rogoff, 1978). They were most likely to be with adults when at home or when far from town, and to be with children aged seven to eleven when about a block from home. Play activities were overwhelmingly in the presence of children, rather than adults. Work activities varied in the degree of adult and peer involvement. Generally, work done at home or far from home was more frequently with adult accompaniment, whereas work done in the neighborhood, but not at home, had little adult involvement but the same amount or more peer involvement.

A number of other studies have used spot observations to investigate the companions and activities of various populations (e.g., Draper, 1975; Johnson, 1973; Munroe and Munroe, 1971a; Whiting and Edwards, in preparation). Another area in which spots may be especially useful is in the study of changes of life styles as a result of modernization.

It is clear that spot observations can provide rich

information about the everyday social settings and activities of children and adults. The use of this information as predictor variables of cognitive test performance may be problematic; test performance may not be related to everyday skills, and there may be no such things as variation in amount of *ability* between individuals. But the spot-observation method *per se* is independent of this weakness. It is best used to measure the behavior of interest, rather than as an indicator of such nonobservable processes as cognition or motivation, unless there is a strong theory linking observations relevant to the process in question.

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REFERENCES

- BRONFENBRENNER, U. 1977. Toward an experimental ecology of human development. *American Psychologist*, 32: 513-531.
- COLE, M., SHARP, D. W., and LAVE, C. 1976. The cognitive consequences of education: Some empirical evidence and theoretical misgivings. *Urban Review*, 9: 218-233.
- D'ANDRADE, R. G. 1975. Cultural Constructions of Reality. In: L. Nader and T. W. Maretzki (Eds.), *Cultural Illness and Health: Essays in Human Adaptation*. Washington, D.C.: American Anthropological Association.
- DRAPER, P. 1975. Cultural pressure on sex difference. *American Ethnologist*, 4: 600-616.
- FREEBERG, N. E., and PAYNE, D. T. 1967. Parental influence on cognitive development in early childhood: A review. *Child Development*, 38: 65-87.
- JOHNSON, A. 1973. The allocation in a Machiguerga community. *Ethnology*, 14: 301-310.
- KAGAN, J., KLEIN, R. E., FINLEY, G. E., ROGOFF, B., NOLAN, E., and HURTADO, E. A crosscultural study of cognitive development. In preparation.
- MUNROE, R. H., and MUNROE, R. L. 1971a. Household density and infant care in an East African society. *Journal of Social Psychology*, 83: 9-13.
- MUNROE, R. H., and MUNROE, R. L. 1971b. Effect of environmental experience on spatial ability in an East African society. *Journal of Social Psychology*, 83: 15-22.
- MUNROE, R. H., and MUNROE, R. L. 1975. Infant Care and Childhood Performance in East Africa. Paper presented at the meetings of Society for Research in Child Development, Denver, Colo.
- NERLOVE, S. B., MUNROE, R. H., and MUNROE, R. L. 1971. Effect of environmental experience on spatial ability: A replication. *Journal of Social Psychology*, 84: 3-10.
- NERLOVE, S. B., ROBERTS, J. M., KLEIN, R. E., YARBROUGH, C., and HABICHT, J. P. 1974. Natural indicators of cognitive development: An observational study of rural Guatemalan children. *Ethos*, 2: 265-295.

- ROGOFF, B. 1977. A portrait of memory in cultural context. Doctoral dissertation, Harvard University Archives. In preparation for publication.
- ROGOFF, B. 1978. Comparison and activities of Highland Mayan children. Paper presented at the meetings of the Society for Cross-cultural Research, New Haven, Conn.
- WHITING, B. B. 1975. The problem of the packaged variable. In: K. F. Riegel and J. A. Meacham (Eds.), *The Developing Individual in a Changing World*, Vol. I. *Historical and Cultural Issues*. The Hague: Mouton.
- WHITING, B. B., and EDWARDS, C. P. Cross-cultural study of sex differences observed in spot and social interaction observations. In preparation.
- WHITING, B. B., and WHITING, J. W. M. 1975. *Children of Six Cultures: A Psycho-Cultural Analysis*. Cambridge, Mass.: Harvard University Press.

Adult Regulative Speech in Mother-Child Interaction

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In his writings, Vygotsky (1962; 1978; in preparation) emphasized that the ontogenetic history of psychological processes must be described as a progression in which "intrapsychological" functioning evolves from "interpsychological" functioning. That is, the ontogenetic progression of any psychological function begins characteristically with the child's dependence on interpersonal interaction, especially with adults, for the mediation and regulation of his actions. Children's self-regulative processes later emerge from the gradual internalization of these adult-regulative processes as they begin to mediate and regulate their own actions as agents independent of adult guidance.

Below, we will discuss different ways in which adult speech can be observed to regulate children's actions in adult-child interactions of a task-oriented (i.e., goal-directed) nature. More specifically, we will compare mothers' utterances to their children in terms of two major dimensions: the degree to which the mother relies on the child's understanding of the goal and strategy and the degree to which she uses nonverbal regulation. These dimensions will allow us to characterize how, during this kind of interaction, decision-making processes that regulate a problem-solving activity are controlled by the mother or have been transferred to the child. This, in turn, will give us a way to look at the process of transfer from inter- to intrapsychological control.

To illustrate this kind of analysis, I will use examples of adult speech that were collected from nine mother-child interactions in which a specific goal had to be reached. This was the completion of one truck

puzzle—"the copy"—to accordance with another, already assembled, puzzle—"the model." The task was specifically chosen so that it would be simple for the adults but difficult enough for the children (2½-, 3½-, and 4½-year-olds) to need adult guidance in various degrees. Mothers were simply asked to "help" their child put the puzzle together in any way they felt appropriate. With this definition of the situation, the over-all goal of the mothers was to get the child to place all the puzzle pieces in a copy in accordance with how they were arranged in the model. Given the nature of the task, a great deal of organizing and sequencing of actions was necessary in order to carry out the strategy involved in placing each puzzle piece correctly in the copy. Some of these steps were: looking at the model; identifying the next relevant color to work with; finding and picking up the relevant piece from the available pile; identifying the correct position in the copy; and placing the piece in the appropriate position (see also Vol. 2, #1, 1978, of *The Quarterly Newsletter*, pp. 15-18).

Most of the mothers' utterances were involved in monitoring the flow of the child's activity by somehow directing the child to carry out appropriate behaviors or sequences of behaviors at specific points during the problem-solving effort. From a functional point of view, we may characterize these utterances generally as "requests for action." Under this label, we include a wide range of syntactic forms, such as the following sample of four utterances:

- (1) "What color is this?" (pointing)
- (2) "Let's find the purple square."
- (3) "We need a purple square for up here." (pointing)
- (4) "I think it goes here, doesn't it?" (rising intonation and pointing)

Utterance (1) is a request for providing information about a specific reference; (2) is a request for performing a specific nonverbal action involving a referent. Similarly, (3) functions as a request for performing a specific nonverbal action and is different from (2) in that only the referent and its desired location are explicitly mentioned in the utterance, whereas the action(s) requested is presupposed (i.e., must be known or inferred by the child). Indeed, (3) immediately preceded (2) in our transcript and was followed by the child's picking up a piece (that was not of the requested color). Finally, (4) is what we might call a request for confirmation of a specific state of affairs. In our transcripts, however, it also functioned as a request for performing a nonverbal action involving a referent: (4) occurred as a child held a puzzle piece ("it") in her hand, wondering where to put it, and was followed by a correct placement of the piece in the copy.

As will become clear below, utterances such as these serve several functions simultaneously. The

functions we attribute to them depend on the very definition of this kind of interaction—that it is an asymmetric “teacher-pupil” situation, in which the mother regulates the child’s problem-solving activity (and in which the child’s inferential capacities may not always allow s/he to understand how the mother’s utterance relates to the task situation). Thus, when isolating the dimensions along which mothers’ utterances vary, we will need to distinguish, for example, the immediate effects of requests (e.g., identifying the color of a piece, placing a piece, etc.) and the effects that they have in the over-all context of the development of the child’s self-regulative processes throughout the interaction.

When making particular utterances at given points in discourse, mothers require (and thus presuppose) that children understand or are able to understand the task situation in various degrees. The first dimension along which mothers’ utterances vary is the degree of presupposed understanding which the child must have readily available in order to respond appropriately to a mother’s request. For example, we may illustrate this dimension by comparing the following requests:

- (5) “Now, what’s next?”
- (6) “Where does that go?” (pointing to a puzzle piece)
- (7) “What color is that?” (pointing to a puzzle piece)
- (8) “Do you see these pieces here?” (pointing to several puzzle pieces)

These utterances vary in the degree to which a response requires an understanding of the over-all goal of the task (i.e., to complete the copy in accordance with the model). To respond correctly to utterances (5) and (6), the child must understand that s/he has to look at the model in order to determine the next relevant piece, as in (5), or the correct position of a piece in the copy, as in (6). In contrast, minimal appropriate responses to utterances (7) and (8) do not require an understanding of the task goal. Rather, they simply require the child to look at the referent indicated by the mother in order to determine some characteristic about it, as in (7), or simply to have this referent in focal attention, as in (8).

We may label such utterances as (5) and (6) “goal-dependent,” and those such as (7) and (8) “goal-independent.” That is, goal-dependent utterances are those to which children can respond appropriately only if they can be relied upon to understand the nature of the task (especially the over-all goal), whereas goal-independent utterances don’t require such understanding. On the basis of this dimension, we can assess the degree of control taken on by the mother and look at the function these utterances may have. For example, goal-independent requests such as (8)—“Do you see these pieces here?”—usually

have the basic function of getting the child to focus on a particular aspect of the speech situation by establishing the existence of a referent which the mother views as relevant to the problem-solving effort and about which further discourse follows. In most cases of such “Do you see [referents]?” requests, the utterance was accompanied or followed by nonverbal interaction initiated by the child toward the referent (e.g., gazing at it, picking it up, pointing to it, etc.). Similarly, a goal-independent request such as (7)—“What color is that?”—may also have the function of getting the child to pay attention to a relevant aspect of the situation, such as color. They differ from “Do you see [referents]?” requests, in that their use already presupposes the existence of the object referred to, and they require the child to identify (verbally or nonverbally) some further characteristic about it. Obviously, the mother already has the information which she requests of the child. Uttering such requests serves to make the child focus on the requested information, which then becomes relevant for his following actions. Clearly, we can say that the mother, in making both kinds of goal-independent requests illustrated above, does not need to presuppose that the child understands at that point in the interaction what action or actions will be performed with that referent, or why an aspect of the situation, such as color, is relevant in relation to the task definition.

In contrast, the use of a goal-dependent request presupposes that the child knows about the existence of relevant referents, their relevant characteristics, and the relevant action(s) that must be performed with them as a means of fulfilling the mother’s request. Of course, the relevance of referents, characteristics, and actions in the situation cannot be defined independently of the over-all goal of the task. Correct responses to goal-dependent requests thus require much more self-regulation on the part of the child in carrying out appropriate actions independently of the mother’s guidance. This is especially true of utterances such as (5)—“Now what’s next?”—which seem simply to “punctuate” the child’s actions and keep him “on-task.” Nothing about (5) guides the child as to the nature of the problem-solving effort at that point, except for temporal adverbials such as “now” and “next,” which indicate that he has just completed a subgoal (usually the placement of one particular piece in the copy), and is about to set up the next subgoal. Most of the decision-making process about what particular action sequence to follow at that point in the interaction is in the hands of the child, and is not a function of any specific guidance on the mother’s part.

Note that when analyzing discourse, one cannot make general claims about the presuppositions that underlie utterance *types* (e.g., goal-dependent versus goal-independent) independently of the specific con-

text of discourse in which any utterance *token* is embedded. Thus, for example, a mother may (correctly or incorrectly) presuppose that her child knows what the goal and/or strategies are in the task and still will use one or more goal-independent requests at a particular point in discourse. As an illustration, consider the occurrence of the three requests underlined in the following exchange (exchange #1) between a mother and her 3½-year-old child:

- Mother: Okay, you want to do a black one. *Where does the black one go?*
- Child: Up here. (points correctly to the black piece in the model)
- M: Up there. *Which one is it on top of?*
- C: It's on top of white. (points to the white piece in the model)
- M: It's next to white.
- C: Yep.
- M: *Is it on top of orange?*
- C: Naaoo . . . yea.
- M: Right, okay, let me see you fit it up there.
- C: (places the black piece correctly in the copy)

The mother has begun by asking a goal-dependent request ("Where does the black one go?"), which is answered correctly by the child. At that point, both the mother and the child are looking at the model. The following two requests ("Which one is it on top of?" and "Is it on top of orange?") must be interpreted as goal-independent requests for information. The function of these two requests might be to "drill" the child to perform some of the subactions necessary in placing the piece in the copy, i.e., identifying the colors and positions of the piece adjacent to the black piece in the model. (Note that the orange piece, which was adjacent to the black piece, had just been placed in the copy.) This sequence is followed by a request for the placement of the piece in the copy (i.e., "Let me see you fit it up there"), to which the child responds correctly. Given that the child had correctly responded to the goal-dependent request "Where does the black one go?" it is not clear whether the next two goal-independent requests were necessary to guide correct placement in the copy or whether the child could have completed this particular subgoal independently. However, in the over-all context of the interaction, such requests can be viewed as providing the tools necessary to regulate the child's behavior at a later point during the problem-solving effort, where, for example, the child might immediately place the piece correctly in the copy (instead of simply pointing to the correct piece in the model) as a response to the mother's goal-dependent request.

Similarly, it often happened that mothers made goal-dependent requests to which they themselves immediately responded. In these cases, it is unclear whether the mother at first assumed too much understanding on the part of the child and then realized

that she would have to take back some of the control she originally had given, or whether she never really expected the child to be able to respond to such complex requests at all. In the latter case, she might be following the instructional strategy of asking goal-dependent (difficult) requests and providing the response herself. For example, consider the following exchange (exchange #2):

- Mother: Look on, look over here. (pointing to the general area of the model)
Where's the blue one go? (points to the blue piece in the model)
Next to the yellow, right? (rising intonation)
- Child: Yep. (places the blue piece correctly in the copy)

Here, the mother makes a request ("Where's the blue one go?") that we can characterize as goal-dependent, but to which she immediately provides the appropriate response, first by pointing to the appropriate position in the model and second by making another request (this time for confirmation: "Next to the yellow, right?"). The child then responds correctly both orally ("Yep") and nonorally (places the piece correctly in the copy). It seems that the child was responding to a combination of all three of the mother's actions and was led in this way to complete a subgoal in the task. As can be seen in such examples, one cannot analyze mothers' requests independently of the verbal and nonverbal context which precedes, accompanies, and follows them.

This brings us to the next dimension along which we wish to contrast mothers' utterances in these instructions: the extent to which mothers rely on nonverbal actions, especially on pointing gestures, in addition to (or often instead of) their verbal regulation. We found that mothers made extensive use of two kinds of nonverbal pointing. In the majority of cases, pointing was used with verbal demonstratives (such as "this one," "that," etc.) in order to refer either to a specific referent (specific pointing) or to a general area (e.g., the general area of the model or the copy) to which the mother wanted to direct the child's attention (general pointing). For example, specific versus general pointing are involved in (7) "What color is that?" (pointing to a specific puzzle piece); #2, "Look over here" (pointing to the general area of the model), respectively. From the videotapes, it is clear that mothers used verbal and nonverbal deictics such as these constantly to monitor the child's attention (e.g., gaze) to various aspects of the situation, whereas when no such deictics were used, mothers relied on the child's ability to respond to her requests strictly on the basis of their verbal regulation. Oftentimes the mothers alternated in using different kinds of nonverbal and/or verbal deictics versus not using them at all. For example, in the following exchange (exchange #3):

Mother: What's the next color? (pause) What's the next color on that truck? (pointing to the general area of the model)

Child: Orange.

The child is able to respond correctly to a goal-dependent request only after the mother uses a general point to regulate his attention. In other cases, the child's gaze follows the nonverbal pointing independently of the mother's verbal output, and is able to place a piece correctly on the basis of such nonverbal regulation.

The importance of this dimension in analyzing mothers' regulative speech must not be overlooked. Note that the use of a nonverbal deictic must be taken into account in categorizing requests as goal-dependent or goal-independent. Consider utterance (5)—"Now what's next?"—in the following cases: (5) is accompanied by a specific nonverbal pointing to the model (a particular piece); it is accompanied by a general pointing to the model; it is not accompanied by any pointing. In the third case, utterance (5) is clearly a goal-dependent request: the child can respond appropriately only if s/he understands the nature of the task. However, in the second and, especially, the first case, it is less clear whether (5) is a goal-dependent or a goal-independent request. An utterance such as (5)—"Now what's next?"—when accompanied by a specific point to the model, may be equivalent to an utterance such as (7)—"What color is that?"—since the child can respond with a color name (e.g., "the blue one") simply on the basis of pointing and the vague understanding that some identification is required by the request.

However, although utterance (5), accompanied by specific pointing, may be equivalent to (7) as far as what is required from the child *at that particular point* in order to respond correctly, we would suggest that these two kinds of utterances may have different effects on the child's performance *later in the problem-solving activity*. Because we are ultimately concerned with the over-all effects of the adult's regulation on the development of the child's self-regulative capacities, it is important to consider goal-dependence and nonverbal regulation when they interact in the adult regulative processes throughout the discourse. It is precisely by having to respond to goal-dependent requests which co-occur with actions that precede and follow them that the child is led to internalize the regulative processes with which he can plan his actions in a goal-directed manner independently of adult guidance. A child may be able to perform separately each one of the subactions inherent in a problem-solving activity (i.e., such as those regulated by the mother's goal-independent requests) and still not know how to proceed with the over-all task. Having to respond to various goal-dependent requests ultimately enables the child to plan and organize appropriately many of those subactions which, in

and of themselves, would not lead to the completion of the task. Thus, most of the goal-independent requests and responses and most of the nonverbal regulation provide the background against which goal-dependent requests become effective.

In order to provide some illustrative data to this claim, we need to look at some of the utterances and nonverbal actions made by the children in these interactions. Consider, for example, the following utterances (exchange #4):

Child: Where does this go, tha—orange next to the blue? (places the orange pieces correctly in the copy)

Mother: That's right, the orange goes next to the blue.

Here, it is significant that the child produces a goal-dependent utterance ("Where does this go?") similar to the goal-dependent requests typically used by the mother in order to guide the child's actions. The child then responds correctly to his own utterance both orally ("orange next to the blue") and nonorally (correct placement). These utterances are prototypical examples of "egocentric speech" (see Vygotsky, 1962). That is, they do not function in this context as communicative utterances; the child is not addressing a request to another interlocutor, but rather to himself in order to guide his own problem-solving activity.

These utterances are typical of the older children we observed (the 4½- and some of the 3½-year-olds). Note that the child's egocentric utterances illustrated in exchange #1 occur in the interaction a few utterances later than our illustration of a goal-dependent request made by the mother and immediately answered by her (exchange #2): "Where's the blue one go?" (specific point); "Next to the yellow, right?" It is clear that, even though the mother actually answers her own request, it is still a communicative utterance (i.e., a genuine request for action addressed to the child) to which the child responded. In contrast, the child's utterance does not serve a communicative function. Nevertheless, both the child's egocentric utterance and the mother's request are followed by a correct placement of a piece by the child, and the similarity between these utterances is striking.

In conclusion, we suggest that examples such as those provided above may give us a clue as to how the child's self-regulative processes emerge from an internalization of adult-regulative processes that occur during adult-child interaction. The two dimensions we selected to discuss here in order to compare mothers' utterances (i.e., goal-dependence and nonverbal regulation) are clearly not the only important characteristics of adult speech in adult-child interactions that are relevant to an analysis of adult-regulative processes. Isolating more of these dimensions would have clear implications for developing a

